

**AMENDMENTS TO THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claim 1 (Currently amended): A method for developing an object-oriented computer program that provides externalization of an object in the program, comprising:

including within computer-readable storage [[a]] program code defining computer operations for providing in memory at runtime a description of an object based on its one or more attributes, said description usable by program code outside of said object to access the stored values of said one or more attributes for externalization of said values.

Claim 2 (original): The method of claim 1 wherein the description indicates the location in memory of an attribute.

Claim 3 (original): The method of claim 2 wherein the description further indicates the amount of space occupied by the attribute.

Claim 4 (original): The method of claim 3 wherein the description further indicates the type of the attribute.

Claim 5 (original): The method of claim 4 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 6 (canceled)

Claim 7 (original): The method of claim 3 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 8 (original): The method of claim 2 wherein the description further indicates the type of the attribute.

Claim 9 (original): The method of claim 2 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 10 (original): The method of claim 1 wherein the description comprises a list including an entry corresponding to an attribute of the object.

Claim 11 (original): The method of claim 10 wherein the entry indicates the location in memory of an attribute.

Claim 12 (original): The method of claim 11 wherein the entry further indicates the amount of space occupied by the attribute.

Claim 13 (original): The method of claim 12 wherein the entry further indicates the type of the attribute.

Claim 14 (original): The method of claim 13 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 15 (original): The method of claim 12 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 16 (original): The method of claim 11 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 17 (original): The method of claim 1 further comprising including within the program second program code apart from said object for accessing said description at runtime.

Claim 18 (original): The method of claim 17 wherein the description indicates the location in memory of an attribute.

Claim 19 (original): The method of claim 18 wherein the description further indicates the amount of space occupied by the attribute.

Claim 20 (original): The method of claim 19 wherein the description further indicates the type of the attribute.

Claim 21 (original): The method of claim 20 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 22 (canceled)

Claim 23 (original): The method of claim 19 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 24 (original): The method of claim 18 wherein the description further indicates the type of the attribute.

Claim 25 (original): The method of claim 18 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 26 (original): The method of claim 17 wherein the description comprises a list including an entry corresponding to an attribute of the object.

Claim 27 (original): The method of claim 26 wherein the entry indicates the location in memory of an attribute.

Claim 28 (original): The method of claim 27 wherein the entry further indicates the amount of space occupied by the attribute.

Claim 29 (original): The method of claim 28 wherein the entry further indicates the type of the attribute.

Claim 30 (original): The method of claim 29 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 31 (original): The method of claim 28 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 32 (original): The method of claim 27 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 33 (original): The method of claim 17 further comprising including within the program third program code apart from said object for producing a representation of an attribute of the object in a secondary format.

Claim 34 (original): The method of claim 33 wherein the description indicates the location in memory of an attribute.

Claim 35 (original): The method of claim 34 wherein the description further indicates the amount of space occupied by the attribute.

Claim 36 (original): The method of claim 35 wherein the description further indicates the type of the attribute.

Claim 37 (original): The method of claim 36 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 38 (canceled)

Claim 39 (original): The method of claim 35 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 40 (original): The method of claim 34 wherein the description further indicates the type of the attribute.

Claim 41 (original): The method of claim 34 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claims 42-48 (canceled)

Claim 49 (Currently amended): A method for facilitating the development of an object-oriented computer program that provides externalization of an object in the program, comprising:  
supplying in computer-readable storage program code defining computer operations for providing in memory at runtime a description of an object based on its one or more attributes, said description usable by program code outside of said object to access the stored values of said one or more attributes for externalization of said values.

Claim 50 (original): The method of claim 49 wherein the description indicates the location in memory of an attribute.

Claim 51 (original): The method of claim 50 wherein the description further indicates the amount of space occupied by the attribute.

Claim 52 (original): The method of claim 51 wherein the description further indicates the type of the attribute.

Claim 53 (original): The method of claim 52 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 54 (canceled)

Claim 55 (original): The method of claim 51 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 56 (original): The method of claim 50 wherein the description further indicates the type of the attribute.

Claim 57 (original): The method of claim 50 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 58 (original): The method of claim 49 wherein the description comprises a list including an entry corresponding to an attribute of the object.

Claim 59 (original): The method of claim 58 wherein the entry indicates the location in memory of an attribute.

Claim 60 (original): The method of claim 59 wherein the entry further indicates the amount of space occupied by the attribute.

Claim 61 (original): The method of claim 60 wherein the entry further indicates the type of the attribute.

Claim 62 (original): The method of claim 61 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 63 (original): The method of claim 60 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 64 (original): The method of claim 59 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 65 (original): The method of claim 49 further comprising supplying for use by an applications developer second program code for accessing said description at runtime apart from said object.

Claim 66 (original): The method of claim 65 wherein the description indicates the location in memory of an attribute.

Claim 67 (original): The method of claim 66 wherein the description further indicates the amount of space occupied by the attribute.

Claim 68 (original): The method of claim 67 wherein the description further indicates the type of the attribute.

Claim 69 (original): The method of claim 68 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 70 (canceled)

Claim 71 (original): The method of claim 67 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 72 (original): The method of claim 66 wherein the description further indicates the type of the attribute.

Claim 73 (original): The method of claim 66 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 74 (original): The method of claim 65 wherein the description comprises a list including an entry corresponding to an attribute of the object.

Claim 75 (original): The method of claim 74 wherein the entry indicates the location in memory of an attribute.

Claim 76 (original): The method of claim 75 wherein the entry further indicates the amount of space occupied by the attribute.

Claim 77 (original): The method of claim 76 wherein the entry further indicates the type of the attribute.

Claim 78 (original): The method of claim 77 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 79 (original): The method of claim 76 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.



Claim 80 (original): The method of claim 75 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 81 (original): The method of claim 65 further comprising supplying for use by an applications developer third program code useful for producing a representation of an attribute of the object in a secondary format apart from said object.

Claim 82 (original): The method of claim 81 wherein the description indicates the location in memory of the attribute.

Claim 83 (original): The method of claim 82 wherein the description further indicates the amount of space occupied by the attribute.

Claim 84 (original): The method of claim 83 wherein the description further indicates the type of the attribute.

Claim 85 (original): The method of claim 84 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 86 (canceled)

Claim 87 (original): The method of claim 83 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 88 (original): The method of claim 82 wherein the description further indicates the type of the attribute.

Claim 89 (original): The method of claim 82 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claims 90-96 (canceled)

Claims 97-144 (canceled)

Claim 145 (Currently amended): A computer system for developing object-oriented data processing applications that provide externalization of an object in a computer program, comprising:

a CPU;

a memory; and

one or more carriers of digital data signals wherein at least one of said carriers includes a program code signal defining computer operations for providing in memory at runtime a description of an object based on its one or more attributes, said description usable by program code outside of said object to access the stored values of said one or more attributes for externalization of said values.

Claim 146 (original): The computer system of claim 145 wherein the description indicates the location in memory of an attribute.

Claim 147 (original): The computer system of claim 146 wherein the description further indicates the amount of space occupied by the attribute.

Claim 148 (original): The computer system of claim 147 wherein the description further indicates the type of the attribute.

Claim 149 (original): The computer system of claim 148 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 150 (canceled)

Claim 151 (original): The computer system of claim 147 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 152 (original): The computer system of claim 146 wherein the description further indicates the type of the attribute.

Claim 153 (original): The computer system of claim 146 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 154 (original): The computer system of claim 145 wherein the description comprises a list including an entry corresponding to an attribute of the object.

Claim 155 (original): The computer system of claim 154 wherein the entry indicates the location in memory of an attribute.

Claim 156 (original): The computer system of claim 155 wherein the entry further indicates the amount of space occupied by the attribute.

Claim 157 (original): The computer system of claim 156 wherein the entry further indicates the type of the attribute.

Claim 158 (original): The computer system of claim 157 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 159 (original): The computer system of claim 156 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 160 (original): The computer system of claim 155 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 161 (original): The computer system of claim 145 wherein at least one of said carriers includes a second program code signal for accessing said description at runtime apart from said object.

Claim 162 (original): The computer system of claim 161 wherein the description indicates the location in memory of an attribute.

Claim 163 (original): The computer system of claim 162 wherein the description further indicates the amount of space occupied by the attribute.

Claim 164 (original): The computer system of claim 163 wherein the description further indicates the type of the attribute.

Claim 165 (original): The computer system of claim 164 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 166 (canceled)

Claim 167 (original): The computer system of claim 163 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 168 (original): The computer system of claim 162 wherein the description further indicates the type of the attribute.

Claim 169 (original): The computer system of claim 162 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 170 (original): The computer system of claim 161 wherein the description comprises a list including an entry corresponding to an attribute of the object.

Claim 171 (original): The computer system of claim 170 wherein the entry indicates the location in memory of an attribute.

Claim 172 (original): The computer system of claim 171 wherein the entry further indicates the amount of space occupied by the attribute.

Claim 173 (original): The computer system of claim 172 wherein the entry further indicates the type of the attribute.

Claim 174 (original): The computer system of claim 173 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 175 (original): The computer system of claim 172 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 176 (original): The computer system of claim 171 wherein the entry further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 177 (original): The computer system of claim 161 wherein at least one of said carriers includes a third program code signal useful for producing at runtime a representation of an attribute of the object in a secondary format apart from said object.

Claim 178 (original): The computer system of claim 177 wherein the description indicates the location in memory of the attribute.

Claim 179 (original): The computer system of claim 178 wherein the description further indicates the amount of space occupied by the attribute.

Claim 180 (original): The computer system of claim 179 wherein the description further indicates the type of the attribute.

Claim 181 (original): The computer system of claim 180 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 182 (canceled)

Claim 183 (original): The computer system of claim 179 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 184 (original): The computer system of claim 178 wherein the description further indicates the type of the attribute.

Claim 185 (original): The computer system of claim 178 wherein the description further indicates a description for the attribute that is based on the attribute's one or more component attributes if the attribute is a second object.

Claim 186-192 (canceled)